MONTHLY NOTICES

OF THE

ROYAL ASTRONOMICAL SOCIETY.

VOL. XLIII. MARCH 9, 1883. No. 5.

E. J. STONE, M.A., F.R.S., President, in the Chair.

The Rev. Edward Aurelius Adams, M.A., Vicar of St. John's, Eastbourne;

Major James Fellowes, R.E., Ordnance Survey Office, Southampton; and

Gerard Brown Finch, M.A., 24 Old Buildings, Lincoln's Inn;

were balloted for and duly elected Fellows of the Society.

Note on a Photograph of the Great Nebula in Orion and some new Stars near θ Orionis. By A. Ainslie Common.

The photograph which I have the honour to present to the Society this evening is a carbon enlargement of a negative taken on January 30, 1883, with the three-foot Reflector, the exposure being thirty-seven minutes.

This photograph shows a marked advance on those I have previously shown at meetings of this Society; and although some of the finer details are lost in the enlargement, sufficient remains to show that we are approaching a time when photography will give us the means of recording in its own inimitable way the shape of a nebula and the relative brightness of the different parts, in a better manner than the most careful hand-drawings.

To find if there is any change of form or relative brightness observable in a nebula with any degree of certainty, it will be necessary to compare photographs taken at some undetermined interval of time; and the best thing to do now seems to me to be to get as many photographs as possible, to form the basis of

comparison with those taken at some future time; and this I am now doing.

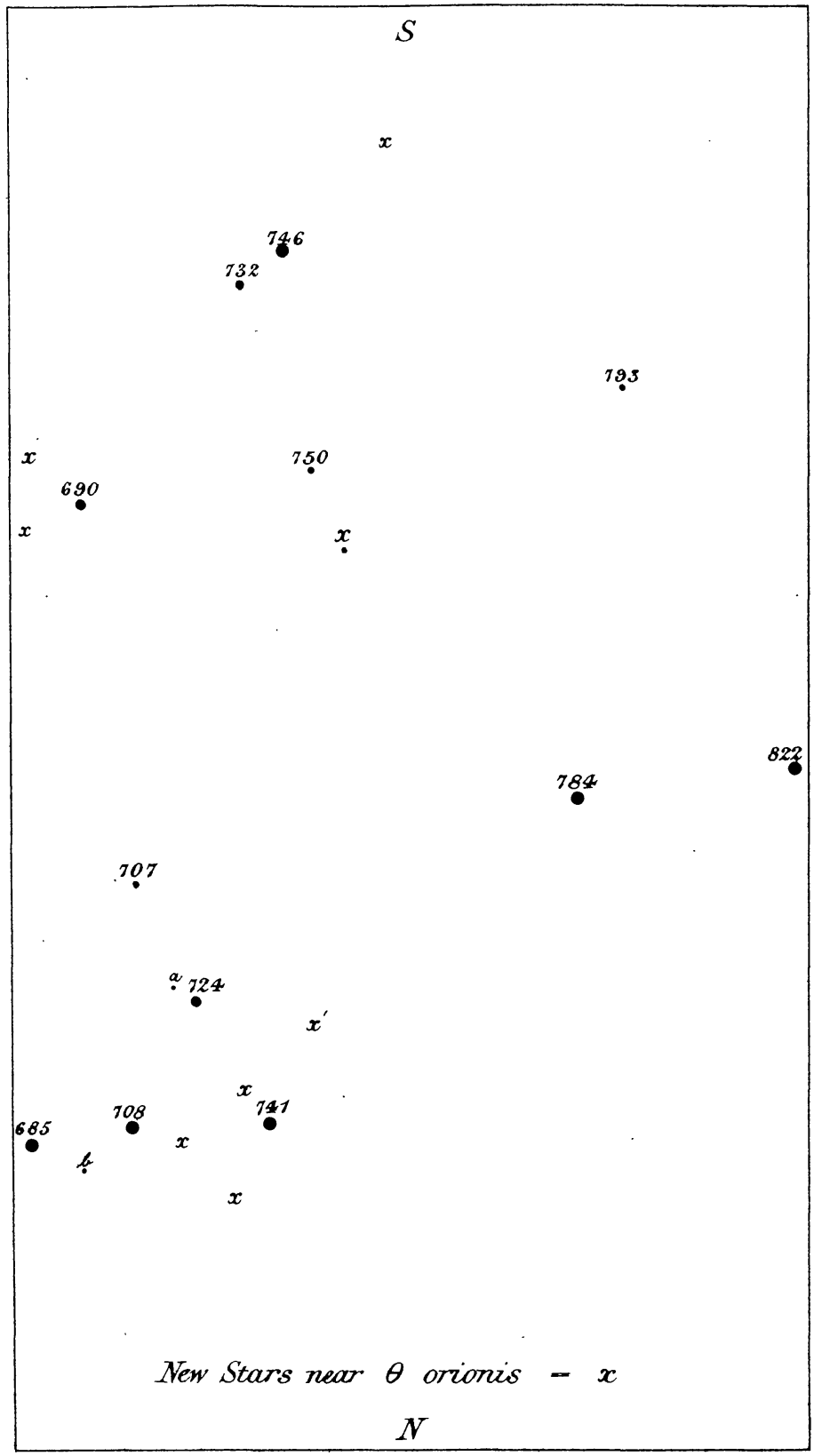
Whilst a comparison of such a photograph as this now shown with any existing drawing can give no reliable evidence of any change having taken place, whatever the observable difference between them may be—for reasons that are very obvious on an inspection and comparison of drawings one with the other—it is very interesting to compare some of the best drawings with the photograph, if only to note the remarkable care that must have been taken in their production.

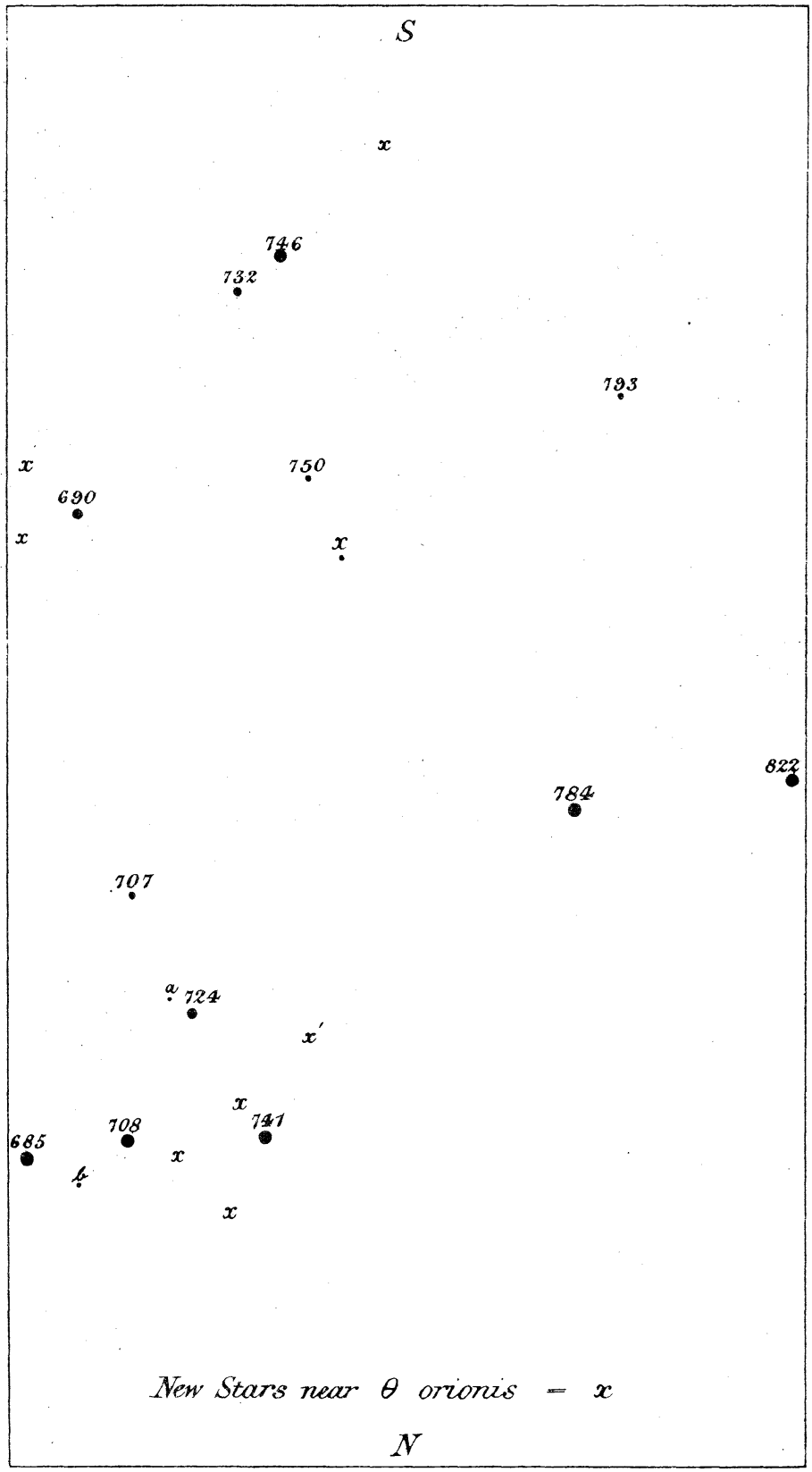
In making this comparison, the first thing that strikes one is the great difference in the relative intensity of the light of the different parts. This seems to have been the great difficulty always, and from the nature of the object, and the impossibility of having it all in view at once, such a result might be expected. The next thing is the presence of so many long streaks of light of pretty uniform intensity in some drawings, and the general representation of masses of light as rounded or gradually shading off, the photograph showing these as collections of cloudy masses of a knotty or curdled appearance—in this agreeing so well with the eye-view when a powerful telescope is used.

The light of this nebula is so different in intensity that for a proper exposure of the outer portions the central part is much over-exposed; it is therefore necessary to take photographs with different exposures. Thus an exposure of from one to three minutes gives the brighter portions of the central parts in such a way that they can be easily compared and their order noted; longer exposures giving portions less bright in a similar way, till, with a maximum exposure, the very faintest portions can be compared and noted in order. The stars in the nebula can be treated in the same way, the same photographs being available.

This photograph shows some of the fainter portions of the nebula; the most noticeable being (1) the faint crescents of light north of and between the stars 335 and 387 (Bond's numbers are used throughout); these crescents of light, as far as I am aware, are only shown in the beautiful drawing of Lord Rosse, published in the *Philosophical Transactions* for 1868; (2) the dark spaces near and south of the star 479 and the dark space near 570; (3) the peculiar extension of the *proboscis major* at its extremity when it suddenly curves away from the star 793; (4) the nebulous spur (particularly noticed by Sir J. Herschel at the Cape) starting from the star 746 and almost joining the *proboscis major* where it curves away, as already mentioned, as if to make room for it; (5) the large mass of faintish light *p*, the *proboscis major*, and running about parallel with it for some considerable distance from the star 784 up to and beyond the star 793.

There are many other interesting points, about which I hope to have more to say when sufficient materials accumulate for





profitable discussion. It is well known that many of the stars in and about the nebula are variable, particularly the faint ones, but I was not prepared to find that one of the brighter stars is remarkably variable, though what its period is I have not yet found.

On looking over the negatives taken during this winter I find that the star 822, mag. 10·7, was on January 5, according to several negatives taken that night, fainter than 707, a star of 11·2 mag. December photographs show it brighter than 784, and much brighter than 707. On January 13 it was again a little brighter than either; on January 26, 784 (mag. 10·8), and 822 are shown as equal; on subsequent photographs it appears brighter, March 4 photograph showing it much the brightest, quite equalling 724, a 10·5 mag. star. This is the only case noted, it being too apparent to be overlooked.

With regard to the fainter stars, Professor Holden in his "Monograph of the Central Parts of the Nebula in *Orion*," on p. 184, speaking of faint stars, says—"It will be interesting to know if other large telescopes show stars fainter than 675, my 1, 2, 3, or Lassell's *b*." On January 27, it being too windy to photograph, I looked carefully over the sub-nebulous region and at once found three stars surrounding 741—two near 690, one near 750—and one *sp.* 746. A sketch of the positions of these stars is given here, the new stars being marked by an *x* and the old stars by Bond's numbers. These stars have been seen again on February 3, when another, *sf.* 741, was added; this is marked *x'*. On looking on this night at other parts of the nebula other faint stars were found, as might be expected. Amongst these may be mentioned a star in the *nebula oblongata*, about 150″ *p.* 848, and on the *s* border of this *nebula*. This is, no doubt, the star marked *x* in the plate given by Sir John Herschel at the end of the second volume of the *Memoirs* of this Society, and referred to by him in the *Cape Observations*, p. 30, where he expresses himself as satisfied it does not exist. Professor Holden's star 1 was seen, but not 2 or 3, while two stars are noted as visible, *np.* 652. Lassell's *a* and *b* have always been seen easily, as well as 675, the latter appearing to me to be quite outside the bright edge of the *frons*.

Of these faint stars I find on this and other photographs that Lassell's *a* and *b* are shown, as well as the two stars near 690, the star near 750, the star *sp.* 746, and the star *sp.* 741. As these stars appear on negatives taken with exposures of from 37 to 60 minutes, and the time of exposure can be easily extended to hours, it may be, and I think is, quite possible to get stars invisible to the eye in the same telescope used for photography.

1883, *March* 9.